

## Comments on the DEIS for the Landscape Vegetation Analysis (LaVA) project

Dennis H. Knight

August 14, 2018

For context, LaVA would affect an extraordinarily large area on the Medicine Bow National Forest (MBNF) because the beetle epidemic has affected a surprisingly large area during the last 20 years. Many young trees are now growing more rapidly, but standing dead trees seem to be everywhere—though most have been removed from around campgrounds and along well-travelled roads. The many that remain are now falling to the ground, concentrating tree boles and branches on the forest floor where forest fires begin. There is the perception that the forests are now more flammable. The wood decays more rapidly once on the ground—a natural phenomenon that contributes to wildlife habitat and soil development. Fallen trees, however, are viewed by some as a wasted resource that could be harvested in sustainable ways. Some maintain that the downed timber is bad for big game and livestock, though the significance of that is difficult to verify. Some species benefit from dead trees and downed wood.

The perceived hazards and waste of the beetle epidemic attracted the attention of Congress, which passed the Healthy Forest Restoration Act (HFRA) in 2003 despite the contention of many forest scientists that “healthy” and “sick” forests are difficult to define. Healthy forests always have many dead trees at times during their development; downed wood is a legacy of past forests that has contributed to the productivity and biological diversity of today’s forests. Nevertheless, the HFRA was followed by a 2015 report by Governor Mead’s Task Force on Forests. The Task Force was co-chaired by a leader in Wyoming’s conservation community and a prominent representative of the timber industry. Other members were representatives from state, local and federal government, industry, conservation groups, forest users, and forest scientists. Recommendations of the Governor’s task force included:

- Proactive reduction of the threat and occurrence of destructive wildfires by managing vegetation and fuels
- Make available and enhance a sustainable supply of wood and biomass consistent with sound management, and explore opportunities to attract and develop a more robust and diverse forest products industry
- Develop a plan to expand outdoor recreation programs in Wyoming forests
- Develop a structure and process for local collaborative groups to review and assess roadless areas and recommend management actions and to consider specific designations and/or releases where appropriate

A press release from the University of Wyoming’s Haub School of Environment and Natural Resources stated, *Wyoming is facing unprecedented disturbances of its forestland (e.g. bark beetle, white pine blister rust, forest fires, invasive species, and drought) that are both widespread and acute. The impacts of these disturbances are broad ranging and*

*limit the ways we are able to use and enjoy our forests, inhibit sustained yields of forest resources, pose a threat to housing and infrastructure at the wildland-urban interface, and degrade wildlife habitat and water quality.*

The National Outdoor Leadership School in Lander appears to have accepted the rationale for bold action, as the following was posted recently on their website: *Many of the [LaVA] recommendations are important to NOLS because they help to ensure that the unique outdoor classrooms in Wyoming are not compromised. By taking preemptive action against threats to forests in Wyoming, we can continue to enjoy and appreciate their supreme resources and beauty.*”

The HFRA and the Governor’s Task Force Report provided the incentive for LaVA, which to date is the most aggressive response to the beetle epidemic of any national forest in Wyoming. The public now has the opportunity to comment on the DEIS. Two alternatives are offered for evaluation: 1) No Action, which would leave in effect the current forest management plan, approved in 2003, and allow forest management and timber harvest to continue as in the past, with NEPA impact assessments conducted as needed; and 2) a Modified Proposed Action plan, which provides an umbrella NEPA assessment for anticipated but unspecified projects during the next 15-20 years and which engages all interested stakeholders, including the public, on a more or less continuous basis. Feedback on past and upcoming projects would be requested annually; forest managers and stakeholders would learn as the project proceeds, enabling adaptive management. This approach is thought to be better because of the large area that is involved and a need for “treatments” as soon as possible. A third alternative was considered but rejected, apparently because it was judged inadequate to meet the management objectives of mitigating—and providing “resilience” for—the perceived beetle/flammability problem in an effective way.

The challenge is deciding if the Modified Proposed Action (MPA) is acceptable and would be effective. Does it create more problems than the No Action (NA) alternative, or should a third alternative be added? Decisions can be based partially on what is known about the natural history of MBNF forests. Multiple-use is still a guiding principle; timber harvest and livestock grazing will continue. Considering climate change, and the amount of land already affected by roads and timber harvesting in the MBNF, along with different perceptions on the aesthetics of the landscape and shifting demands for different natural resources, there is now much uncertainty about the best way to manage national forests. Difficult decisions will have to be made.

In this review, I present comments on the following: 1) Aspects of the natural history and ecology of MBNF forests that provide context for evaluating the No Action (NA) and Modified Proposed Action (MPA) alternatives, 2) a few highlights of the two alternatives, 3) a list of the strengths of this DEIS, and 4) a summary of deficiencies that should be rectified before a course of action is selected.

**Are the current disturbances unprecedented?**

The Rocky Mountain forests that we see today have been developing and changing since the glaciers began to melt and conifers and aspen slowly occupied newly exposed terrain. During the ensuing eight or nine thousand years, the forests have been subjected on dozens of occasions to wildfires, insect epidemics, diseases, windstorms, and drought. Some disturbances most likely were patchy, covering a small area, but others would have been widespread. Droughts lasting several years or even decades occurred, and wildfires during such times could have burned across most of the Medicine Bow Mountains and Sierra Madre. Considering that drought and a warming climate can favor bark beetles, epidemics of these insects might have occurred at about the same time as large fires. Everything known about lodgepole pine, Engelmann spruce, subalpine fir, and aspen—the four tree species that occupy most of the forested area that would be affected by LaVA—suggests they become re-established after stand-replacing wildfires. Also, it is well known that forests dominated by green conifers can burn during dry, windy years as well as those with many dead trees. Moreover these trees have co-existed for thousands of years with nearly all of the insects and diseases that still plague them today.

Notably, ponderosa pine and Douglas-fir woodlands in the foothills are different. They have become adapted for frequent surface fires, which historically killed mostly small trees, keeping the forest understory relatively open and less likely to sustain canopy fires. Low-intensity surface fires are relatively easy to control in such stands, except where managers and homeowners have suppressed fires and tree density has increased. Mechanical thinning can reduce the likelihood of an uncontrollable crown fire in foothill woodlands, but they occupy less than a few percent of the LaVA project area. Considering that crown fires still occur in foothill woodlands, they have a mixed-severity fire regime.

Thus, the widespread beetle epidemics and the potential for wildfires that concern many people should not be considered as unprecedented.

However, climate change, introduced diseases and noxious weeds, and an extensive road network are new.

- With regard to climate change, for many years scientists thought the higher elevations of the Medicine Bow Mountains and Sierra Madre, where lodgepole pine, spruce and fir predominate, were too cold for beetle epidemics. Climate warming is the only factor that can account for the broad geographic area over which this most recent beetle epidemic expanded (from Colorado to British Columbia). Rapid climate change in recent decades, combined with large numbers of susceptible trees, led to the beetle epidemic. Of course, the climate has changed in various ways for thousands of years, cooling at times and warming at other times. Climate change *per se* has occurred before, but most climatologists have concluded that changes in the last century have been more rapid because of carbon dioxide and other greenhouse gas emissions. Rapid climate change is new and must be considered when making land management decisions. The DEIS does not do that.

- One introduced disease—white pine blister rust— was identified in Wyoming about 25 years ago and it is now killing limber pine on portions of the MBNF. So far it has not been found in the Sierra Madre and Snowy Range units. Disturbances caused by native pathogens are not unprecedented, but it is not yet possible to know if insect epidemics in the past killed as many trees in the LaVA project area as they have in the 21<sup>st</sup> century.
- The problems associated with introduced noxious weeds would be unprecedented, though their expansion thus far has been slow in the LaVA project area.
- The 2,192-mile road network on the LaVA project area is greater than any other national forest in Wyoming, mainly because roads are relatively easy to build on the relatively flat Snowy Range and Sierra Madre units. The additional 600 miles of temporary roads that could be constructed with the Modified Proposed Action plan would further fragment the landscape, but, considering that these additional roads would be closed after three years, this kind of disturbance is more relevant to the enjoyment of these landscapes by some sectors of the public than it is to the forest *per se*. The additional temporary roads might facilitate access for more effective fire suppression until they are again covered with trees, which seems to be a modern-day priority, but the temporary roads themselves are not likely to function as fire breaks, considering they will be reclaimed after three years and that widespread fires occur only under dry, windy conditions and will easily jump narrow roads with air-borne embers (spotting).

### **Some highlights of the two alternatives**

Writing a DEIS such as this is a monumental task, one that requires considering the cumulative effects of numerous impacts over two mountain ranges on various natural resources and considering values not shared by a diverse group of stakeholders. With the No Action alternative, management would proceed as it has for many years. The public could provide comments on each environmental impact assessment. The goal would be to achieve multiple-use management in a sustainable way while working toward the desired future conditions specified in the 2003 forest plan.

The MBNF and its collaborators, including the Wyoming Game and Fish Department, prefer the Modified Proposed Action because it provides managers with opportunities to treat effects of the widespread epidemic without repeated, time-consuming NEPA assessments. Greater flexibility is provided for managers to practice their training. The HFRA enabled this short-cutting of the NEPA process, the Governor's Task Force on Forests provided the incentive, and some think that harvesting hazardous trees around campgrounds, along roads, and in the Wildland-Urban Interface (WUI) is not enough. Many details would be left to the expertise of managers, but, the DEIS emphasizes, the public would be apprised of proposals annually and stakeholder feedback would guide how the project develops. With the Modified Proposed Action plan, the collaborators are attempting to develop a new model for forest management, one that, it is thought, will be more effective with regard to staff time, involving the public, and achieving the desired future conditions adopted in the forest plan. That plan, approved in 2003, is not up for review at this time.

For the Modified Proposed Action, the following numbers have been set as upper limits for the next 15-20 years:

- 148 square miles (95,000 acres) of clearcuts (even-aged management)
- 258 square miles (165,000 acres) of thinning/intermediate management (uneven-aged management)
- 156 square miles (100,000 acres) of prescribed fire, mastication, and hand-thinning
- 600 miles of temporary logging roads.

Again, these numbers are upper limits. The cost to the American public of the additional roads and treatments is not likely to be covered by revenue from timber sales, but people concerned about this must decide if the benefits that the DEIS claims for the Modified Proposed Action alternative are realistic and justified. They include:

- Enhanced resilience (ability to resist or recover from disturbance) when future insect and disease infestations occur
- Recovery of forest products
- Providing for human safety and protecting infrastructure and municipal water supplies
- Restoring wildlife habitat, mitigating hazardous fuel loading, and providing access for recreation.

With No Action, the DEIS claims on page 220 that “the risk of wildfire, insect infestations, and disease would continue in the project area. Water supplies to Cheyenne, Laramie, and other communities could be adversely affected. Smoke emissions, damage to infrastructure, and the risk of falling trees . . . could displace users.” In addition, natural forest processes would be “insufficient to move [the forest] to desired conditions,” as defined in the current MBNF Plan.

### **Strengths of the DEIS**

- The MBNF developed this plan in collaboration with the Wyoming Game and Fish Department and numerous other state and local agencies. Cumulative Impact Assessment was attempted. Adopting the principles of adaptive management, collaborators and the public will be provided opportunities annually to submit feedback on what has been done, what is proposed for the coming year, and what seems acceptable or not acceptable at that point. The specifics lacking in this DEIS, including detailed maps, would be provided and updated on the web (Appendix A). The process would be transparent. Objections could be filed.
- While abiding by the recommendations of the Governor’s Task Force on Forests, and providing access to wood for the timber industry (already authorized in the 2003 Plan), there is a clear expression of intent to protect the environment, especially with regard to wetlands and water quality. All environmental regulations would continue in effect.

- The importance of wildlife security areas is recognized, as is the fact that some kinds of wildlife benefit from beetle epidemics. Security areas are defined as tracts of 250 acres or more that are at least ½ mile from a road or motorized traffic.
- There is recognition that most erosion and noxious weed expansion is associated with the construction and use of roads, skid trails, and landings, which will become more common if the MPA is adopted. Existing roads would be used whenever possible, the reclamation of landings and skid trails would start after three years, and temporary roads would be closed and reclaimed after three years.
- The values of scenic vistas and other aesthetic features are acknowledged.
- The challenges of private land ownership in the WUI of western coniferous forests are recognized.

## **Deficiencies in the Modified Proposed Action**

### ***Managing for forest resilience***

Making forests more resilient is a primary motivation for the project, which, it is proposed, would be done using timber harvest and prescribed fire to promote forests over a sufficiently large area that are 1) less likely to sustain future epidemics of insects and diseases or are capable of relatively rapid recovery if such epidemics do occur, and 2) are less flammable than the current forests or are capable of relatively rapid regrowth if a fire does occur. The DEIS suggests that working to achieve these goals requires treatments over a large area because smaller treated areas would be subsumed by the characteristics of the surrounding, untreated forests. Several questions arise:

1. Considering that a very large proportion of the trees in the Sierra Madre and Medicine Bow Mountains that sustained the 15-year epidemic have already been killed, and that the growth of smaller, younger trees has been accelerated, how do the proposed treatments improve the resiliency of the forest to future insect epidemics? The forests are proving to be resilient. Is the hope to prevent beetle epidemics 70 or more years from now, when the trees might become susceptible to beetles again, at a time when the larger trees are under stress, such as during a drought? Is the goal to manage the forests on the project area so that only controllable surface fires are possible? Will this sustain the desired wildlife?

Many years are likely to pass before the current trees are susceptible to beetles. What is the best estimate for when that might occur, and how is the climate likely to have changed by that time? The sustainable management of all natural resources now requires a more careful consideration of the effects of climate change than is presented in this DEIS. The resiliency that managers hope to introduce now very likely will not be tested until the last quarter of the 21<sup>st</sup> century, when the climate in the project area is projected to be considerably different. And long before that, during episodic droughts, large portions of the project area are likely to burn.

2. Is the goal of LaVA to change the structure of lodgepole, spruce, and fir forests so they look more like managed, more open ponderosa pine forest in the Black Hills? That would be a major decision, one that needs a more thorough environmental assessment than is presented in the DEIS.

Much of the DEIS gives the impression that fuel management on up to 414 square miles of lodgepole and spruce-fir forest will be essentially the same as for foothill forests and woodlands, that is, thin the forest mechanically or by hand, pile and burn (or masticate) the slash, and use prescribed fire when weather conditions are suitable. Further description of the probable future structure of many mountain forests is needed, with photos or drawings. This should not be difficult.

3. With regard to wildfires, justify the rationale that fuel management can be sufficient to counter the effects of climate.

Most research on lodgepole pine and spruce-fir forests has shown that climate is a more important driver of large fires than fuel loadings, yet the DEIS places great emphasis on the potential for fuel reduction (amount and continuity) for adding resiliency to fire. In this case, resiliency seems to mean resistance to fire, as the adaptations of montane trees suggest that they are likely to regrow into new forests as rapidly as should be expected at our high elevations. Managers have no control over the climate, but before impacting the existing forest over such a large area, there should be a more thorough consideration of the relative effects of fuels and climate on flammability.

Pertinent to this question is a paper published last year in the Proceedings of the National Academy of Sciences (Schoennagel et al. 2017, volume 114, pages 4582-4590), which concluded,

“Patterns of wildfire are changing with rising global temperatures, and will accelerate in the future. What we can do now is focus management efforts on the places where intervention is needed to slow the pace of change and thereby give particular species and ecosystems a chance to adapt. We also can change how we build, live, and work in fire-prone landscapes to keep our communities safe, healthy, and vibrant.”

What are the implications of this statement for LaVA? On one hand, it could mean recognizing that mountain forests are prone to infrequent high-intensity fires that will not be easily extinguished and minimizing the number of structures in the forest that require herculean efforts to protect. Also, slowing “the pace of change” and giving “particular species and ecosystems a chance to adapt” suggests that silvicultural treatments should be gentle rather than aggressive, working with natural processes.

On the other hand, this statement could be interpreted as an endorsement of the Modified Proposed Action. The rationale would be that, because of climate change and the already more frequent wildfires in western forests, intensive management is required to modify the forests in a way that species and ecosystems are less likely to become rare or extinct

because of these new, rapidly changing climatic conditions. Conservation biologists and the timber industry could become allies. Research suggests that the forests of the MBNF will be considerably different in 50 years because of climate change (warmer, earlier snowmelt, longer summers, increased probability of drought and wildfires), which is relevant to management decisions made today. The DEIS does not consider these changes adequately. What is done during the next 10-15 years will affect what happens during the rest of the century.

4. Also with regard to resilience, further discussion is needed on when and where insect epidemics influence the probability of fire.

Prominent forest ecologists in the Rocky Mountain region concluded (Romme et al. 2007, cited but not discussed in the DEIS):

“When the weather conditions are right for a big fire in spruce-fir or lodgepole pine, fire behavior is naturally intense, whether affected by previous insect activity or not. If insect outbreaks do in fact increase the likelihood of fires getting started or burning intensely through these kinds of forests, the magnitude of increase probably is small and difficult to detect, because fire is so strongly controlled by weather [temperature, drought, wind] in these forests, and because they naturally burn at high intensity. . . Removing dead trees and other fuels can effectively reduce the risk of fire damage at a local scale, e.g., in the immediate vicinity of a home or community. However, the effectiveness of harvest in reducing fire risk over larger areas, e.g., a forest landscape, is less clear. Conventional timber harvest may do little to reduce fire risk at any scale if it removes primarily large trees, because smaller trees, brush, and dead fuels often are the major carriers of spreading fire. Harvesting smaller trees and removing small fuels may more effectively reduce fire risk.”

Considering that forests on the MBNF have been affected by beetles and fire numerous times in the last several thousand years, is there reason to be concerned about their recovery now? A reasonable response to people raising this issue is that national forests are managed for multiple uses that include timber production, livestock grazing, recreation, wildlife, and the runoff of high quality water as well as the conservation of biological diversity. The DEIS suggests that letting natural processes take their course after such a widespread disturbance is not sufficient for achieving the “desired future conditions” adopted in the last forest plan.

Notably, although the MBNF already is heavily impacted by human activities, there are still some “reference areas,” such as the four areas designated by Congress as Wilderness (Savage Run, Platte River, Huston Park, and Encampment River) and the 25 Inventories Roadless Areas (IRAs) listed in the DEIS. No roads are proposed for these areas, but, significantly, thinning and prescribed fires could affect up to 54 percent of the IRAs (124,290 acres, 194 square miles of the IRAs over a 10-year period; there are currently 230,240 acres in IRAs). Natural processes would be allowed to continue in designated wilderness and 46 percent of the IRAs, except for lightning-ignited fires that would be

suppressed as soon as possible. The wilderness areas surely will burn eventually. Suppressing fires leads to conditions where fires cannot be suppressed.

5. Considering climate change and the value of roadless areas, and that the MBNF is already heavily roaded, what level of confidence is there in the assertion that the proposed thinning and prescribed fire in IRAs will add significantly to the effectiveness of the project?

IRAs add to the benefits of wildlands in an otherwise heavily managed landscape. Treatments to increase resilience and reduce the flammability of IRAs would involve hand thinning, feller-bunchers, and prescribed fire up to 1,000 feet away from existing roads. Up to 54 percent of the IRAs could be severely impacted by these treatments even if no temporary roads are constructed. The DEIS does not justify this impact.

6. One of the motivations for timber management in the past has been to grow healthy young forests with a road network that enables more effective fire suppression, yet we find ourselves with the situation we have today. Was not enough forest “treated” during the last 50 years? Would the required amount of treatment have been excessive for meeting other desired future conditions? Are the “desired future conditions” in the 2003 plan realistic? There is not enough discussion of this topic in the DEIS.

7. Are prescribed fires in mountain forests realistic? How often during a summer can suitable weather be expected? Will most prescribed fires be burning slash piles in the winter? What is the experience of burning slash piles in the project area? The research on the MBNF of Chuck Rhoades and Paula Fornwalt is not cited?

8. The reason for no third option appears to be that anything less than the Modified Proposed Action would be ineffective for restoring resilience and avoiding wildfires. Further discussion is needed.

9. Would forests on steep slopes be considered for treatment, for the same reasons as IRAs are proposed for treatment? Steep slopes were largely excluded from treatments in the past because of their erodability.

In summary for this topic of resiliency, formidable challenges have been presented by the most recent beetle epidemics, occurring at a time when climate change must be considered. There is a sense of urgency that something must be done to achieve desired future conditions while protecting the environment, maintaining an aesthetically pleasing landscape, and providing opportunities for outdoor recreation and a viable timber and livestock industry. However, as Romme et al. (2007) point out, “Natural ecological processes generally lead to the development of new forests after insect outbreaks, so a ‘no treatment’ option can be a form of responsible forest management.” The primary incentive for the Modified Proposed Action seems to be a concern that hazardous, widespread wildfires are imminent and that the opportunity for harvesting sound beetle-killed trees is being lost as they fall to the ground and decay. Human safety concerns about falling trees along roads and near campgrounds have already been addressed in

most areas. The beetles themselves have “beetle proofed” the forests for many decades. Other developments that happen during the next generation of trees are likely to be more important than what is done in the next 15 years. The size of the Modified Proposed Action is not adequately justified.

### ***Treatment considerations***

10. In even-aged treatments (clearcuts), what guidelines will be used for snags, green tree retention, and downed wood (CWD)? This is not presented.

11. In the past, slope has restricted where timber harvesting would occur? Will this be true during the next 15-20 years?

12. With regard to soil scarification, there are many young lodgepole pine seedlings in the understory where beetles have killed larger trees and where there has been no scarification. Thus, is scarification necessary for even-aged lodgepole regeneration? Scarification is expensive and increases the likelihood of erosion. The reasons for even-aged treatments over such a large area are not clear.

13. On page 163, there is the sentence: “A total of 455 miles (13.5 percent) of road are located on wet soil types. . . Of the 455 miles, 186 are existing closed roads that could be reopened as part of the LaVA Project.” Thus, will 269 miles of new temporary roads be constructed on wet soil types, with drainage and erosion issues? Are the benefits of these new roads worth the costs of construction and potential environmental damage? Are so many miles of new temporary roads needed because so many of the older, existing roads (closed or still open) pass through younger post-harvest stands that are not yet ready for re-entry?

14. On page 162, there is the statement that there “would be 1.4 times the amount of harvest in wetlands that has occurred on the Medicine Bow since the 1930s or about 34 times the amount of harvest that has occurred in wetlands in the last 14 years while implementing the current forest plan.” On page 161: “. . . 20 times the amount of temporary road construction that has occurred through wetlands in the last 14 years . . .” Why the need to accelerate road building and harvesting on sensitive wetland sites?

15. What proportion of TOAs will be to maintain or restore aspen, which now covers about 22,000 acres in the Snowy Range unit and 53,000 acres in the Sierra Madre?

16. Where is the old-growth now and where would the treatments be done in relation to old-growth? What proportion of old-growth is in Wilderness and IRAs?

17. Considering how intensively the project area has already been harvested, will the new roads access forests that once were judged less suitable for timber harvest (non-commercial forest land), such as on shallow soils and steep slopes? Could the map of Treatment Opportunity Areas (TOAs) be superimposed on a stand age map?

### ***Extreme assertions***

18. What is the basis for the statement on page 164 that high severity fires lead to complete loss of soil microbes, woody debris, and the protective forest floor. Elsewhere concerns are expressed about creating hydrophobic soils.

“Complete loss” of soil microbes and woody debris is rare, if it ever occurs. Much of the large woody debris does not burn during a fire, and new woody debris soon develops as the dead standing trees fall. Generally, within a few years there is more woody debris on the forest floor than before the fire. The forest floor often burns, as the vertical structure of the forest floor indicates, but even severe fires are patchy. There may be the potential for hydrophobicity on the soil surface, but that tends to be uncommon, patchy, and short-lived (1-2 years). Has it been observed on the recent Keystone and Badger Creek fires, for example? Is this a widespread problem in the project area. A few random tests after the severe Yellowstone fires in 1988 did not suggest hydrophobicity there. There are reasons to be concerned about wildfires of any severity, but extreme assertions that are not well substantiated should be avoided.

19. Similarly, correct the statement (on page 89), “High-intensity wildfires could kill aspen clones.” Typically, aspen clones survive even though the above-ground shoots (ramets) are consumed. New aspen root sprouts grow rapidly, more rapidly than the conifers. Aspen is well adapted to fire, even if a portion of its root system is burned. Is there evidence to the contrary in the Rockies?

20. On page 34, there is the statement that clearcuts would “remove all vegetation within the treated unit.” Really?

Why is there is no mention of green-tree retention, snag retention, or woody debris? There is no discussion about the elevations at which even-aged harvest would be allowed, and how anticipated climate change might affect silvicultural treatments. Some parts of the DEIS sound like they were written decades ago when the timber industry dominated western national forests. That combined with statements by the Secretary of Agriculture Perdue suggest that those days are returning. He said in 2017, “Regarding the U.S. Forest Service and our public lands, I think it’s time to start looking at forests as crops, as agriculture . . .” A poor choice of words, but . . .

### ***Some details that need clarification or correction***

21. On page 162 there is the sentence: “While short-term degradation could occur, reintroduction of fire into this landscape and movement toward a more natural fire regime would have a long-term benefit for water quality.” What is the basis for this statement? What is meant by “more natural fire regime” in this case?

The “natural fire regime” of lodgepole pine and spruce-fir forests has been shown to be infrequent, high-severity, stand-replacing fires, but the DEIS gives the impression that this is what the LaVA project is designed to avoid. Or perhaps the Modified Proposed

Action would attempt to create a patchy mosaic, so that all of a watershed is less likely to burn in a given year, even if the fire kills most of the trees where it does burn. Clarification is needed.

22. The DEIS states on page 198 that about 2 percent of homes in the project area are in the WUI. Where are the rest of them?

23. On page 94, there is the implication that fire return interval will be “accelerated.” What does this mean?

24. Is there a basis for stating that fire usually follows insect outbreaks within 15 years, implying cause and effect? Samman et al. 2000 is cited but not included in the references. More likely, both epidemics and fires occur coincidentally during droughts and higher temperatures. In general, the reference section is incomplete or some references are not cited in the text where they are pertinent to the discussion.

25. What is meant by the suggestion that recent disturbances “are nearing stand-replacement intervals”?

26. On page 95 there is the suggestion that Douglas-fir has photosynthetically-active bark, which makes the tree sensitive to surface fires. Aspen trees have photosynthetically-active bark—not Douglas-fir?

27. On page 99 there is the statement: “Fire behavior in lodgepole pine is generally low-intensity surface fire . . .,” referring to the timber litter fuel type model (TLC). This requires documentation or clarification, as drought, temperature, and wind are more important than fuel loading in this forest type.

28. The Modified Proposed Action would minimize the TU5 model condition, which applies when downed fuels are present. Right now there are 59,886 acres in this fuel type. Would prescribed fire or handwork be used to remove downed wood and small-diameter fuels other than commercially valuable bolewood?

29. On page 192 there is the statement that IRAs can be a “reference landscape,” which contradicts a statement on page 191 that they are not. What is the intent?

30. Prescribed fires will be ignited only when weather conditions are favorable, but that means they will have a short flame length. Will they be effective? How many days of favorable weather have occurred in the last two or three years? What will be done if prescribed fires are not practical or feasible on the project area? Or do prescribed fires include piling and burning slash?

31. Mistletoe is not included in the insect/disease damage table for 2000-16, yet it is used as a rationale for large tracts of even-aged management.

32. It would be good to include plausible scenarios for several TOAs, to give reviewers a sample of how the project would unfold in a specific area during a three-year period. Using a map of existing roads for these representative areas, it should be possible to add the locations of where the new temporary roads would be. That could be superimposed on a map of old-growth and IRAs in the representative area.

33. The rationale for including the Sheep Mountain Game Refuge as a TOA is not clear.

### **Summary**

Approval of the Modified Proposed Action could make it easier for the project to proceed. The public will have access to regular updates and annual opportunities to provide feedback; monitoring is proposed. The collaborative aspects of the proposal are laudable, but drafts of ambitious, complicated projects covering large proportions of a national forest must be convincing. Some aspects of the Modified Proposed Action proposal are good, but the possibly unprecedented magnitude of the project raises concerns that I think should be resolved. The multiple-use mandate can be achieved in various ways, one of which could be with the No Action alternative. A third alternative should be considered, one with a list of TOAs that does not include Sheep Mountain and the other IRAs. As is, the DEIS does not present a compelling rationale for treating such a large area.